

Lesson 3: Heat Energy (convection, conduction, radiation)
Grade 3- Unit: Energy

Engage: Show students two balloons- one with air and one with water. Hold them both over the flame of a candle and ask them why they think this is happening.

<http://www.physicscentral.com/experiment/physicsathome/balloon.cfm>

The heat is absorbed by the water, therefore there is no weakness in the balloon to make it rip.

Explore: Help students set up the experiment for data collection in their lab notebooks: "Getting Warmer" Which spoon will be the warmest after one minute? Which cups will be the warmest after one minute?

Have students come up to make observations. Have students write notes in their lab notebooks.

Why do you think that this happened? Share with your tablemates!
(Teacher listens to each group share/take notes on student ideas)

Differentiation (give handout to 402 kids to glue into lab notebooks)

Thermal Energy

Part 1: Prediction: Which of the spoons will be the warmest after one minute?

Metal, plastic, or wood ? Why do you think this?

Observations: (What happened?)

Part 2: Prediction: Which of the mugs was the warmest after one minute?

Glass, plastic, metal (aluminum)

Observations: (What happened?)

Explain: Read pages 462-464 independently.

Convection

Conduction

Radiation

https://www.youtube.com/watch?v=Atnjo7dD_bA

Have students set up a chart in their notebook that has a space for all three types. Have students stop and jot throughout the above video. Have students draw a picture of an example of each below their definition.

Conduction	Convection	Radiation

Elaborate: Give students the following worksheet to practice.

http://www.irysec.vic.edu.au/userfiles/ehung/8HW_3types_of_heat_transfer.pdf

Evaluate: Check answers together. Teacher listens and observes as we discuss the answers to clarify any confusion.

Exit Slip: Draw a diagram of each form of heat energy. Then, write an explanation of how each form of energy works and give an example of each energy working (ex. The sun emits radiation)

Classroom Behavior & Participation

4	3	2	1
Very Quite (whispering)	Quiet (little noise)	Loud (when teacher rings the bell you stop)	Very loud (students can not hear the teacher)
Get to work right away. Stays focused	Most people are working and get started quickly	Takes a while to get started on work	Not working
Has the right materials out	Has some of the right materials out	Has few of the right materials out	A lot of "stuff" out
Stays seated	Tries to stay in seat	Moving around class without permission	Out of seat and student needs to take a calming break.

Academic Investigations

4	3	2	1
Asks thoughtful and scientific questions	Asks questions about topic	Rarely asks questions	Does not ask questions
Collects and organizes data in a clear way	Collects data in a organized way	Data is missing important information	Does not collect data
Uses evidence to make sound conclusions	Uses evidence to answer the questions being asked	Rarely finds evidence to support claim	Will not answer the question using evidence from the lab
Makes connections to personal experiences	Understands how topic is useful in real life/personal experiences	Doesn't quite understand how the topic relates to real life/personal experiences	Does not make connections to real life/personal experiences